Volume 80
Issue 4 *Issue 4, The National Coal Issue*

Article 5

June 1978

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West Virginia Law Review

Volume 80 Summer 1978 Number 4

LEGAL PROBLEMS RELATING TO OWNERSHIP OF GAS FOUND IN COAL DEPOSITS

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In the United States, a fee simple in real property may be divided by the severance of mineral interests such as coal, oil and gas from the surface estate. For example, coal located on a given tract may be reserved by a grantor who sells his interest in the surface; or the mineral may be conveyed by a grantor who retains his rights to the surface. In either case, the coal is considered an estate in real property and may be owned in fee simple.[1]

In American coal regions it is not at all unusual to find that a given tract of land is owned by several people. That is, the oil and gas is owned by one person, the coal by another, and the surface by another. To complicate matters even more, a single tract may be underlaid by several coal seams, each of which may be owned by unrelated persons or corporate entities. Recently, this sometimes complicated superstructure of fact and corresponding legal fiction has given rise to another significant legal problem. As natural gas prices have risen to reflect shortened supply and an increased demand, the gas found in the nation's coal deposits has suddenly been recognized as having the potential to become a supplemental source of commercial pipeline quality natural gas.

Methane gas, firedamp, coal or coalbed gas are various terms used to identify the natural gas contained in and emitted from coal

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[1] *See generally* K. DONLEY, THE LAW OF COAL, OIL, AND GAS IN VIRGINIA AND WEST VIRGINIA (1951). Of course, coal and other minerals may also be leased for the purpose of mining and sale. For the purposes of this article the person or other entity who has a vested interest in coal or gas will be referred to as "the owner" as a matter of linguistic convenience, notwithstanding the fact that the possessor of such rights is often a "lessee." When the distinction between owner and lessee is significant to legal analysis, its import will be noted.

deposits.[2] Coalbed gas has long been considered a hazard to American underground coal mining operations. Explosions caused by ignitions of the gas have caused the death of many underground coal miners.[3] But the substance once viewed as a threat is now seen as a potential boon. Those who once shunned responsibility for the problems caused by coalbed gas now rush to claim the title to, and the profits from, the gas. A central question to be resolved thus concerns the ownership of the coalbed gas. Is the substance owned by the coal owner or lessee, the oil and gas owner or lessee, or the surface owner? The answer to this question is not readily apparent.

In 1941, Professor C. C. Williams, Jr. wrote in this Journal what has been, until now, the only published discourse on the legal implications of capture and use of gas found in underground coal deposits.[4] In the introduction to his article Professor Williams observed:

> It has often been said that there is a considerable mass of undeveloped law in the field of coal mining. Certainly this is true as to legal phases of horizontal stratification of land ownership: the very readiness of courts to interpret mineral deeds as establishing subjacent fees leads to new regions of theoretical exploration. When those overlap, or when their boundaries are left up in the air, the lawyer has the difficult and delicate task of adjusting property titles by using the traditional doctrines of the past. . . . Occurrence of marketable gas in coal seams offers no exception to test that rule.[5]

This conclusion is as true today as it was in 1941. In 1978, the first case to directly raise the issue of ownership of coalbed gas came to

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[2] Throughout this article this type of gas will be referred to as "coalbed gas." It is not used as a term of art, but rather simply for the sake of clarity and consistency. Moreover its use does not imply that it is the author's view that coalbed gas is not a type of natural gas.

[3] *See* BUREAU OF MINES, U.S. DEPT. OF INTERIOR, HISTORICAL SUMMARY OF COAL-MINE EXPLOSIONS IN THE UNITED STATES 1, (Bureau of Mines Information Circular No. 7900, 1963) (hereinafter cited as Bureau of Mines Information Circular No. 7900); M. IRANI, C. TIMMONS, T. BOBBICK, M. DEUL AND M. ZABETAKIS, METHANE EMISSION FROM UNITED STATES COAL MINES, A SURVEY, (Bureau of Mines Information Circular No. 8558, 1972) (hereinafter cited as DEUL AND ZABETAKIS).

[4] Williams, *On Leasing Gas from Coal Seams*, 47 W. VA. L. Q. 211 (1941). The West Virginia Law Quarterly was later renamed the West Virginia Law Review. *See also* E. CRAIG, III AND M. MYERS, OWNERSHIP OF METHANE GAS IN COALBEDS (1978) (to be published in ROCKY MTN. MIN. L. INST.) (hereinafter cited as E. CRAIG, III AND M. MYERS); *but see* Olson, *Coalbed Methane: Legal Considerations Affecting its Development as an Energy Source*, 13 TULSA L. R. 377 (1978).

[5] Williams, *supra* note 4.

the courts. In a preliminary ruling in *United States Steel Corp. v. Hoge* a Pennsylvania trial court stated:

> It is a highly intriguing, especially complex question, one that has never been given judicial introspection before, and one also which carries with it almost immeasurable economic impact in these days of critical energy considerations.[6]

In order to put the ownership question in proper perspective it is essential that the reader first have a threshold understanding of historical, technical, and economic data that relates to degasification of coal deposits.

HISTORY AND BACKGROUND

Because of the great safety hazard to mining operations caused by coalbed gas emissions, both the government and the coal industry have attempted to design mining methods that reduce the accumulation of coalbed gas in working areas of deep mines. The method used extensively to rid American mines of coalbed gas is forced air ventilation.[7] This technique involves the use of extremely large ventilation fans located at surface openings of underground mines. These fans cause air to pass through areas of the mine where gas accumulates, thereby diluting it to a safe level and carrying the gas to an exhaust opening, where it is emitted into the atmosphere.

Government regulations adopted pursuant to the Federal Coal Mine Safety and Health Act and similar state legislation set limits on the amount of coalbed gas that may lawfully be allowed to accumulate in a working area of an underground mine.[8] If such limits are exceeded, production must cease until the ventilation system adequately dilutes the gas to acceptable levels.[9] The cost of production stoppages, together with the cost of ventilation sys-

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[6] United States Steel Corp. v. Hoge, No. 682 (Ct. of Com. Pleas of Greene County, Penna., filed May 4, 1978). This decision is discussed extensively in E. CRAIG, III AND M. MYERS, *supra* note 4.

[7] There were relatively early attempts made to eliminate the coalbed gas safety hazard either by drilling traditional gas wells from the surface and draining the gas or by drilling in advance of mining through the coal from within the mine itself. *See* SPINDLER, DEGASIFICATION OF THE PITTSBURGH COAL SEAM, (Proceeding of the American Institute of Mining Engineers, 1958).

[8] Federal Coal Mine Safety and Health Act of 1977, 30 U. S. C. §§ 863, 877(h); W. Va. Code § 22-2-4 (1978 Replacement Vol.).

[9] *Id. See also* Deul and Skow, *Speeding Coal Mining Operations by Recovery and Utilizing Methane from Coalbeds,* COAL AGE 104 (July, 1975).

tems, is high, and thus the presence of coalbed gas may have a significant negative effect on coal production.[10]

While the total number of United States coal mine fatalities has decreased in recent years, the number of deaths attributable to gas ignitions in underground mines has increased.[11] This increase in coal mine explosions has been traced by the United States Bureau of Mines to the fact that deeper coalbeds are being mined at a faster rate due to new technology. Deeper mines have generally been found to contain more gas than shallow seam mines, and thus more of the dangerous gas is emitted from them.[12]

It has been estimated that underground coal mines in the United States ventilate two hundred million cubic feet of coalbed gas per day (cfd) into the atmosphere. Moreover, it has been estimated that seventy-five billion cubic feet of coalbed gas is ventilated each year. Such an amount is sufficient to meet the natural gas needs of much of New England.[13] Recoverable quantities of coalbed gas are present in both the Appalachian and Western coal regions. Deep high rank[14] coalbeds are most likely to produce gas of commercially marketable quality and quantity. Such coalbeds are found throughout the Appalachian coal region, from Pennsylvania and West Virginia to Alabama.[15] Preliminary studies indicate that deep coalbeds in Colorado, Arkansas, Oklahoma, Utah and New Mexico may also contain recoverable coalbed gas.[16] De-

[10] C. ELDER AND M. DEUL, DEGASIFICATION OF THE MARY LEE COALBED NEAR OAK GROVE, JEFFERSON COUNTY, ALABAMA, BY VERTICAL BOREHOLE IN ADVANCE OF MINING, (Bureau of Mines Report of Investigation No. 7968, 1974).

[11] M. ZABETAKIS, M. DEUL AND M. SKOW, METHANE CONTROL IN UNITED STATES MINES, (Bureau of Mines Information Circular No. 8600, 1973).

[12] M. DEUL AND M. ZABETAKIS, *supra* note 3.

[13] Deul, *Degasification of Coalbeds, A Commercial Source of Pipeline Gas*, AM. GAS A. MONTHLY (May, 1976).

[14] "Rank" refers to coal quality in terms of British Thermal Units ("Btu"). Coal quality is graded downward from anthracite, bituminous, sub-bituminous to lignite at the lower end of the scale; the lower the rank, the lower the Btu.

[15] Bureau of Mines studies indicate that significant quantities of coalbed gas have been produced from the Pittsburgh seam in Pennsylvania and West Virginia, the Mary Lee seam in Alabama, and the Hartshorne seam in Oklahoma. C. ELDER AND M. DEUL, *supra* note 10. Significant quantities of coalbed gas are not generally present in eastern strippable coals or shallow cover drift mined coals because the gas has migrated through the geologic strata and escaped to the atmosphere. M. DEUL, METHANE DRAINAGE FROM COALBEDS: A PROGRAM OF APPLIED RESEARCH, (Proceedings of the Annual Meeting of The Rocky Mountain Coal Mining Institute, June 28-July 1, 1964).

[16] U.S. DEPT. OF ENERGY, REPT. OF THE AD HOC TASK FORCE ON METHANE DRAINAGE, (submitted to the Asst. Secretary for Resource Applications, December,

gasification of coal mines for safety reasons and for commercial use and/or sale is not a novel idea. In fact, it is a fairly routine practice in Western Europe, the Soviet Union and Japan,[17] and has occasionally been practiced in the United States as well.[18]

TECHNOLOGY OF COALBED GAS EXTRACTION

There are several methods of coalbed gas extraction which have been shown to be effective. The least expensive of these is the small diameter[19] vertical borehole. This type of well is similar to the conventional natural gas well, but the volume of gas emitted is significantly limited unless hydraulic stimulation techniques ("hydrofracturing") are used.[20] Tests of this latter technique in three different coal seams have produced five to twenty-fold increases in gas flow over the pre-stimulation rate.[21] However, hydrofracturing from small diameter wells is alleged to have at least one major drawback: it has been said to cause harm to the coal

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1977). Marketable quantities of coalbed gas may also exist in other states of the midwest and western coal regions, however, no preliminary research on those areas has yet been published. It should be noted that only about one quarter of the coal in the western states is above sub-bituminous rank. Until recently most western coal was thought to be very low in gas content per ton of coal, and thus it was concluded that it does not contain substantial reservoir of gas. However, recent studies indicate that this conclusion may have been erroneous. While a ten foot thick eastern bituminous coal seam might contain three hundred cubic feet of gas per ton of coal, a western sub-bituminous coal seam one hundred feet thick containing forty cubic feet of gas per ton of coal would potentially be an even larger source of gas. C. MCCULLOCH AND M. DEUL, METHANE FROM COAL 121-136 (Symposium of the Geology of Rocky Mountain Coal, 1976).

[17] Coal mining methods are significantly different in those areas as are the means of extracting gas from coal deposits. *See* VENTER AND STASSEN, DRAINAGE AND UTILIZATION OF FIREDAMP, (Bureau of Mines Information Circular No. 7670, 1953); M. Deul and A. Kim, *Degasification of Coalbeds,* AM. GAS A. MONTHLY 7 (May, 1976).

[18] Degasification of underground coal mines in the United States has taken place sporadically for at least forty years. *See* SPINDLER, *supra* note 7. *See also* Williams at 213, *supra* note 4.

[19] The diameter of these boreholes is 9 inches or less.

[20] Hydraulic stimulation is often referred to as hydrofracturing or "hydrofracing." This technique utilizes a small diameter vertical borehole which is drilled from the surface into the coalbed and cased. Existing fractures in the coalbed (natural fracturing of the coal seam is common) are expanded by the application of hydraulic pressure and controlled injection of water into the coal. Sand grains in the injected fluid "prop" the fractures open when the pressure is released.

[21] The estimated drainage area for a single small diameter borehole well is twenty to thirty acres and 1500 feet is considered optimum well spacing.

seam and to roof strata overlying the coal, thus causing some coal companies to condemn the technique as creating a potential safety hazard.[22]

A second means of extracting gas from coalbeds is called the "longwall gob" method which also involves the use of small diameter vertical boreholes. This method is used only in conjunction with longwall mining. As such mining intercepts the borehole, the coal overburden fractures. Gas that accumulates in the gob (collapsed overburden) is pumped out through the borehole.[23]

A third proven method of coalbed gas extraction involves the construction of a large vertical shaft to the coal.[24] At the bottom of the shaft, horizontal radial holes are drilled through hundreds of feet of surrounding coal, and gas is drawn off to the surface through receiver pipes. Because of economic considerations, the shaft should be planned as a ventilation shaft and be constructed several years in advance of mining. Thus, the construction costs would then be chargeable to the mining operation, and not to the degasification.[25]

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[22] *See* United States Steel Corp. v. Hoge, No. 682 (Ct. Com. Pleas of Greene County, Penna., filed May 4, 1978) (opinion of Toothman, J.). This allegation is based on the premise that hydrofracturing will cause the layer of rock or shale overlying the coal to crack; later when the coal is mined the cracked strata would be the roof of the underground mine passages. Injuries from roof falls are already a major source of mine injuries and fatalities and the suggestion is that if the stability of a mine roof deteriorates as a result of hydrofracturing, many more injuries may result. If the roof strata were damaged severely, mining could not take place at all. *But see* C. ELDER, EFFECTS OF HYDRAULIC STIMULATION ON COALBEDS AND ASSOCIATED STRATA, (Bureau of Mines Report of Investigation No. 8260, 1977), a preliminary study which indicates no harm to the roof or coal from hydrofracturing. European coal seams are degasified using hydraulic stimulation techniques according to Cervik, *An Investigation of the Behavior and Control of Methane Gas, reprinted in* MINING CONGRESS J. (July, 1967).

[23] *See* C. ELDER, USE OF VERTICAL BOREHOLES FOR ASSISTING VENTILATION OF LONGWALL GOB AREAS, (Bureau of Mines Report of Investigation No. 7651, 1972). The longwall gob method is not as feasible as other methods of gas extraction because the percentage of coalbed gas in the gob decreases within a year and the heating value may fall below 600 Btu per cubic foot; relatively poor quality gas.

[24] This scenario assumes, of course, that the owner of the gas and coal is one and the same.

[25] *See, e.g.*, H. FIELDS, S. KRICKOVIC, A. SAINATO AND M. ZABETAKIS, DEGASIFICATION OF VIRGIN PITTSBURGH COALBED THROUGH A LARGE BOREHOLE, (Bureau of Mines Report of Investigation No. 7800, 1973); H. FIELDS, J. PERRY AND M. DEUL, COMMERCIAL QUALITY GAS FROM A MULTIPURPOSE BOREHOLE LOCATED IN THE PITTSBURGH COALBED, (Bureau of Mines Report of Investigation No. 8025, 1975). Other noteworthy methods of coalbed gas extraction include horizontal holes drilled into the coal from appropriate areas in an active mine and slant or directional holes drilled at

COMMERCIAL ATTRACTIVENESS OF COALBED GAS EXTRACTION

On the basis of existing research and demonstration projects, the newly formed United States Department of Energy (DOE) has concluded that both recovery and utilization of coalbed gas are technically feasible. A DOE research program designed to investigate the economic feasibility of commercial extraction and utilization of coalbed gas is currently underway.[26] Data is being compiled by DOE so that reliable cost estimates can be made. In arriving at such estimates, the Department must take into account the fact that the economics of gas extraction can vary considerably depending on factors such as coalbed permeability, proximity of drilling site to pipelines, and Btu value.[27] Preliminary studies of the Bureau of Mines indicate that gas recovery from large diameter shafts coupled with horizontal holes,[28] or recovery by means of hydrauli-

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an angle from the surface to the coal. Horizontal holes drilled from inside a mine interrupt a large number of natural coalbed fractures and produce high gas flow rates without hydraulic stimulation. At present gas drained this way is not captured; rather, it is exhausted to the atmosphere through the mine ventilation system. U.S. DEPT. OF ENERGY, REPORT OF THE AD HOC TASK FORCE ON METHANE DRAINAGE, (Submitted to the Ass't Secretary—Resource Applications, December, 1977) (hereinafter cited as REPORT OF THE AD HOC TASK FORCE). The slant or directional hole extraction technique utilizes a small diameter borehole drilled at an angle from the surface so that it is parallel to the place where it intersects the coalbed. This technique may be used in areas where conventional vertical or horizontal holes are not feasible. This method of degasification is still somewhat experimental. *See, e.g.*, W. DIAMOND, OYLER AND H. FIELDS, DIRECTIONALLY CONTROLLED DRILLING TO HORIZONTALLY INTERCEPT SELECTED STRATA, UPPER FREEPORT COALBED, GREENE COUNTY, PA., (Bureau of Mines Report of Investigation No. 8231, 1977). In a test slant hole the coal was horizontally penetrated more than four hundred feet.

[26] *See* National Coal Ass'n., COAL NEWS (May 5, 1977).

[27] M. DEUL & A. KIM, SAFETY AND ECONOMIC IMPLICATIONS OF THE DEGASIFICATION OF COALBEDS, PROCEEDING of First Symposium on Underground Mining 1-8 (National Coal Ass'n.— Bituminous Coal Research Conf. And Expo II, Louisville, Ky., October, 1975). *See generally* REPORT OF THE AD HOC TASK FORCE, *supra* note 25.

[28] Horizontal holes drilled several years in advance of mining from large diameter shafts would appear to be economically feasible if the high cost of construction of the shaft (estimated by one study at over $750,000 at current costs) could be applied to mining operations. Such a charge-off would be plausible because the shaft could be located and used for ventilation when mining advances to the shaft area. The shaft construction could be integrated into the mine ventilation system even though it is planned and carried out several years prior to mining; thus the cost of the horizontal holes drilled from the bottom of the shaft and the cost of equipment for delivering the coalbed gas to a surface pipeline would be the only amounts charged to degasification. The value of the recovered gas could be from two to five times this cost. *See* Deul and Kim, *Coalbeds: A Source of Natural Gas*, 47 OIL AND GAS J. (June 16, 1975).

cally stimulated vertical hole technology would be commercially feasible.[29] The costs of construction have been recovered in one or two years using these methods in experimental operations.[30]

Commercial extraction and use of coalbed gas appears to be economically feasible.[31] The cost of exploration is lower than in searches for oil or natural gas found in other geologic formations because the location of most coalbeds is well documented. Depending upon the type of technology used, low development and capital investment costs can be expected.[32] If coalbeds are selected properly, it has been estimated that more than seventy-five percent of coalbed gas wells will produce commercial quantities of pipeline-quality gas.[33] Such a success rate is much greater than that in traditional oil and gas field development. Moreover, it is noteworthy that many potentially productive coalbeds underlie large areas of the eastern, midwestern and western United States in close proximity to existing natural gas pipelines and established gas markets. This fact enhances the economic feasibility of degasification.[34]

The potential commercial uses of coalbed gas are varied. Coalbed gas contains a mixture of gases and is very similar in quality and composition to the natural gas found in other geologic formations.[35] The heating value of gas drained directly from

[29] The volume of gas recovered is much less than that associated with large diameter shaft extraction; however, the cost of vertical shaft stimulation and recovery is much less. The cost of a nine-inch diameter vertical borehole drilled less than 1000 feet into the coalbed could be anywhere from $12,000 to $20,000 at current costs. Added costs for extension of electric power lines, compressors, pump jack, water retention and treatment facilities, pipeline extensions, hydraulic stimulation, casing, fencing and site preparation could more than double or triple this figure depending upon circumstances. The technology for directional or slant boreholes apparently is not sufficiently developed to make currently meaningful cost estimates.

[30] M. DEUL, M. SKOW AND A. KIM, HELPING FINANCE NEW MINES WITH REVENUES FROM COALBED DEGASIFICATION, *reprinted from* Proceedings of 3rd Symposium on Underground Mining (Nat'l. Coal Ass'n.—Bituminous Coal Research Conf. and Expo IV, Cowsville, Ky., October, 1977).

[31] *See, e.g.*, M. DEUL AND M. SKOW, *supra* note 9; M. DEUL AND A. KIM, *supra* note 27.

[32] For a brief review of the development technology see notes 19-25 and accompanying text, *infra*.

[33] M. DEUL AND A. KIM, *supra* note 16.

[34] *Id.*

[35] Like other naturally occurring fuel gases, the primary constituent (80-90%) of coalbed gas is methane (CH_4). A. KIM, THE COMPOSITION OF COALBED GAS, (Bureau of Mines Report of Investigation No. 7762, 1973).

coalbeds is usually more than 900 Btu per cubic foot. Such quality would allow it to be fed directly into commercial gas pipelines.[36] Therefore, coalbed gas could be used as a chemical feedstock, converted to liquid natural gas (LNG), be used in gas turbines to generate electricity, or used as a boiler or process heating fuel by local industries.[37] These indications of the economic feasibility of coalbed gas extraction are even more encouraging when it is realized that there are concomitant advantages of improved mine safety, increased coal production and reduced ventilation costs.

LEGAL CONSTRAINTS ON COMMERCIAL RECOVERY OF COALBED GAS

Determination of ownership of coalbed gas is obviously not a problem when the minerals have not been severed and a given tract is owned in fee. However, when there are separate owners of gas and coal rights, determination of the ownership of coalbed gas as between the two[38] presents a difficult problem, which, if left unresolved, constitutes a substantial deterrent to the development of the gas as an economically viable energy source.[39]

Many problems, legal and practical, arise if the gas owner[40] is held to own the coalbed gas underlying a given tract, including:

A. May the coal owner ventilate coalbed gas during mining operations and, if so, must he pay the gas owner for waste?
B. If the coal owner may ventilate gas for safety reasons without compensating the owner, may he also capture the gas by degasification prior to mining and sell it or use it himself?
C. To what extent can the gas owner use recovery techniques such as hydraulic stimulation that may decrease the mineability of the coalbed, assuming that such a technique might damage the "roof" strata and thus make mining unsafe?[41]

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[36] Geoghegan, *Methane Recovery Would Please All,* 2 COAL INDUSTRY NEWS No. 7 (April 3, 1978).

[37] REPORT OF THE AD HOC TASK FORCE, *supra* note 25.

[38] The surface owner arguably may have an interest in coalbed gas as well. *See* discussion at notes 50-55, 68-73 and accompanying text, *infra.*

[39] *See* REPORT OF THE AD HOC TASK FORCE, *supra* note 25. *See also Gas Found in Nation's Coal Beds Attracts Interest as a New Source of Heating Fuel,* Wall St. J., August 21, 1975, at 28.

[40] The gas owner and the surface owner may be one and the same in some instances. Also it might be argued that even if the right to the gas has been leased, the surface owner retained the right to coalbed gas, *see* discussion at notes 56-60 and accompanying text, *infra.* Most of the problems mentioned above would also be relevant if the surface owner were adjudged owner of the coalbed gas.

[41] *See* discussion of hydrofracturing and roof damage at notes 20-22 and accompanying text, *infra.*

D. If the gas owner must compensate the coal owner for interference with the latter's right to mine, what would the measure of damages be and how would such damage be factually established? Would there be a duty to mitigate damages?
E. May the gas owner enjoin mining of coal to deter waste of his coalbed gas and, alternatively, might the owner of coal enjoin the gas owner from interfering with mining?
F. Would the surface owner have any right to royalties if coalbed gas is captured and sold by either coal or gas owner? If so, how would the amount of the royalty be established?

While the question of coalbed gas ownership and related issues have only recently reached the courts, there have been no decisions precisely on point.[42] The only published discussion of these issues since Professor William's seminal article[43] is contained in an official opinion of the Attorney General of Pennsylvania.[44] That opinion, while advisory, is not binding on the Commonwealth's courts.

The Attorney General's opinion analyzes the ownership problem in several steps. First, coalbed gas is likened to gas found in other geological formations. Pennsylvania common law pertaining to natural gas ownership is then applied. By relying exclusively on two cases from the nineteenth century, the opinion concludes that in Pennsylvania neither land owner, grantee nor lessee of gas has absolute title to the substance "in place."[45]

Next, the opinion recognizes that when coal is mined, the coal operator liberates gas and ventilates it to the outdoor atmosphere as required by federal and state mine safety laws. "In this sense," opines the Attorney General, "the coal company has control of the . . . gas." Following this line of inquiry, the opinion then asks rhetorically whether such control indicates that title to the coalbed gas is in the coal owner? Answering in the negative, the opinion relies on the statement in *Chartiers Block Coal Co. v. Mellon,*[46] that the "grantee of coal owns the coal but nothing else, save the right of access to it and the right to take it away."[47] This result,

[42] In *United States Steel Corp. v. Hoge, supra* note 6, the trial court has ruled only on preliminary matters.

[43] Williams, *supra* note 4.

[44] 53 Op. Pa. Att'y Gen. (1974).

[45] Westmoreland N. Gas Co. v. DeWitt, 130 Pa. 235, 18 A. 724 (1889); Brown v. Vandergrift, 80 Pa. 142 (1875). These cases emphasize that in Pennsylvania minerals are considered to be *ferae naturae,* like a wild animal, and are not subject to absolute ownership until brought under control.

[46] 152 Pa. 286, 25 A. 597 (1893).

[47] *Id.* at 296.

however, could have the effect of denying the coal mine operator the right to ventilate gas from the mine, thus making mining impossible. Recognizing the import of such a result, the Attorney General's opinion concludes that, when the coal was sold or leased for mining purposes, implicit in the conveyance was the right of the coal owner to undertake those actions necessary to insure the safety of such mining. The right to mine safely by ventilating coalbed gas does not, however, carry with it the right to convert the gas to the coal owner's profitable use, for "the coal owner or grantee only retains the right to extract coal. . . . [T]he right to access to, and economic control of, the . . . gas belongs to the owner or grantee of the gas rights."[48]

The Attorney General's opinion seems, at first blush, to be a reasonable and logical analysis of a difficult problem. Closer scrutiny, however, reveals that the precedential authority upon which the opinion is based does not support the conclusion reached. First, the fact that Pennsylvania embraces the "rule of capture" theory of gas ownership rather than the rule of absolute title to gas "in place" is clearly not relevant to the problem at hand. The essence of the rule of capture is that the owner of oil and/or gas rights of a tract of land possesses full title to the oil and gas that is produced from wells drilled by him on that land, regardless of whether that oil and gas migrates from adjoining tracts.[49] The rule of capture and the ownership in place theories or derivatives therefrom are embraced by all oil and gas producing jurisdictions. They are common law rules established to enable courts to reasonably mediate ownership disputes between adjacent property owners. The necessity for such mediation arises because of the nature of oil and natural gas; the physical properties of both allow them to migrate through underground geological formations. Thus, gas and oil un-

[48] 53 Op. Pa. Att'y Gen. (1974). The opinion also concludes that coalbed gas is a "natural gas" in the sense that that term is generally used:

> Since methane gas is a natural gas, only those owners and grantees of gas rights have the right of access to, and therefore, economic control of, (coalbed) gas. Any attempt by the owners or grantees of coal rights to convert methane to profitable use could be challenged by those individuals who have acquired the gas rights. *Id.*

While there can be little argument with the conclusion that coalbed gas is a "natural gas" it does not necessarily follow that the gas owner has title to it, for in constructing a conveyance of real property it is axiomatic that the intent of the parties must ultimately prevail. *See* discussion at notes 74-84 and accompanying text, *infra.*

[49] *See generally* H. WILLIAMS AND C. MEYERS, OIL AND GAS LAW §§ 203-204.9 (abr. ed.).

derlying one tract of land may be drawn off by a well drilled on the adjoining property of another.

The concept of ownership in place is that natural gas or oil is subject to ownership, sale, and severance as it lies beneath the earth's surface in the same manner as coal or any other material found in solid form. As a practical matter, however, ownership in place is little more than a legal fiction because prior to capture it is not possible to prove how much oil or gas lies beneath a given tract (or how much has been siphoned off from adjacent lands).

"Capture" and "in place" ownership theories were designed to help courts decide between the competing interests of adjacent owners of the same substance, be it gas or oil. These theories are simply not apposite nor relevant to an analysis of the coalbed gas ownership question which involves a dispute between owners of different substances, gas and coal, underlying the same tract.

In addition, the Pennsylvania Attorney General's reliance on *Chartiers Block Coal Co. v. Mellon* is misplaced. The Attorney General cites the *Chartiers* language which says in essence that the coal owner possesses the right to the coal and nothing else. The implication is that the coalbed gas is not coal and thus the coal owner has no legal right to it. The statement in *Chartiers,* however, is taken out of context. That case involved the right of a gas owner to drill through a coal seam to reach a lower rock stratum which contained natural gas. In upholding the right of a gas owner to penetrate the coal seam in a reasonable manner to reach underlying geological formations, the court in dicta emphasized that ownership of coal was not a license to interfere with another's rights. If defies logic to argue that this dicta, which supports a legal proposition totally unrelated to coalbed gas, is somehow determinative of the coalbed gas ownership dispute.

Possible Analogies to Coalbed Gas Ownership Problem

Because ownership of coalbed gas is a question of first impression for the courts, it seems likely that arguments will be made by the competing parties based on analogies to cases involving other types of energy resources. It would be helpful to examine some of these possible arguments in order to determine if they might be a useful analytical tool.

Ownership of "container space" is one such analogy. The term refers to the subterranean space created by the removal of coal during mining operations. Such areas are often used as haulage-

ways to transport coal from areas of a mine underlying one tract to a surface portal located on another tract. The issue of ownership of such container space generally arises in situations where the coal operator attempts to use the container space from which coal has already been mined as a haulageway to carry coal from other tracts to the surface. The surface owner objects to such use of the container space, arguing that once the coal is extracted the coal owner's rights are extinguished.

There are two divergent lines of case authority addressing this issue. In *Clayborn v. Camilla Red Ash Coal Co.*, the Virginia Supreme Court held that the grantee of coal in place has no corporeal estate in the containing walls.[50] "[T]he conveyance carries the estate in coal only, with the necessary incidental easement [for support and for extractions]."[51] However, the majority of jurisdictions considering the question have followed the reasoning in *Lillibridge v. Lackawanna Coal Co.*[52] In that case the Supreme Court of Pennsylvania held that the ownership of minerals in place is a corporeal hereditament identical to an estate in land. The court rejected the argument that the fee in container space remains with the surface estate subject merely to an easement for extraction of coal. But the *Lillibridge* holding has been modified, for many later cases limit the right of the coal owner to use the container space in aid of mining other properties to the period during which the coal owner is actively mining the coal without exhausting or abandoning it.[53]

If the *Lillibridge* view of ownership of container space is accepted, there is a strong argument for concomitant ownership of all other elements contained within the coal stratum, including methane gas. The analogy, however, does not seem appropriate because the issue of container space ownership was not raised di-

[50] 128 Va. 383, 105 S.E. 117 (1921).

[51] *Id.* at 119.

[52] 143 Pa. 293, 22 A. 1035 (1891).

[53] *See, e.g.*, Westerman v. Pennsylvania Salt Mfg. Co., 260 Pa. 140, 103 A. 539 (1918); Fisher v. West Virginia Coal and Transp. Co., 137 W. Va. 613, 73 S.E.2d 633 (1952). *See also* Chartiers Block Coal Co. v. Mellon, 152 Pa. 286, 25 A. 597 (1893). A coal lessee or licensee in contrast to a coal grantee, in the absence of an express contractual provision, will not usually be allowed to use underground container space to assist mining operations on adjacent tracts. In a limited number of cases coal lessees have been permitted to use container space to aid in mining adjacent properties; these cases, however, involve leases which confer on the lessee such broad privileges that he might practically be considered an owner in fee. *See generally* Annot. 83 A.L.R.2d 665, 668 (1962).

rectly, but rather in the context of determining rights to access for haulage purposes. Moreover, it is clear that the container space argument can work against the coal owner in certain situations and may therefore not be the best possible theoretical framework for a claim to methane ownership. For instance, in *Pennsylvania v. United States Steel Corp.*,[54] the State of Pennsylvania brought an action to force the corporation to extinguish an underground mine fire located in a coal seam mined by the coal owners' predecessor in interest six decades earlier. U. S. Steel argued strenuously that any estate in the container space had reverted by operation of law to the grantor upon exhaustion or abandonment. In a similar vein, a coal operator argued in *Pennsylvania v. Barnes and Tucker*[55] that it had no responsibility for treating acid mine drainage flowing from its inactive mine (container space). It seems inconsistent to argue on the one hand that the coal owner possesses everything in the strata containing the coal seam, including the container space (and coalbed gas), while on the other hand disclaiming responsibility for disadvantageous aspects of such ownership.

Another analogy worthy of attention involves "casinghead gas." This term is used in the oil business to describe the vaporous gas which flows from the casinghead of an oil well. Unlike "natural" gas, gasoline can be extracted from casinghead gas.[56] Like coalbed gas, casinghead gas was originally considered an annoyance and sometimes constituted a serious fire hazard at the well. Early oil and gas leases were negotiated by parties who failed to recognize the potential value of converting casinghead gas to gasoline. The failure of the parties to such leases to consider casinghead gas at the time of execution gave rise to considerable litigation in the first three decades of this century. Both casinghead and coalbed gases are highly volatile, hazardous hydrocarbons originally considered as unfortunate by-products of the extraction of oil and coal. In the case of coalbed gas, commercial viability is only now developing. However, the conversion of casinghead gas to gasoline became commercially feasible about sixty years ago and the legal testing period has, for the most part, ended.

The early casinghead gas case law developed between 1910 and 1930 in West Virginia, Louisiana, Texas and Oklahoma. The

[54] 17 Pa. Com. Ct. 591, 333 A.2d 489 (1975).

[55] 445 Pa. 392, 319 A. 2d 871 (1974).

[56] *See generally* Hardwicke, *Evolution of Casinghead Gas Law*, 8 TEX. L. REV. 1 (1929).

standard oil and gas lease of that period reserved a ⅛ royalty interest in oil and provided for an annual rental for producing gas wells. The early leases made no mention of casinghead gas. When faced with a dispute between the grantor and the oil and gas lessee over the disposition of casinghead gas, state courts had several theoretical alternatives.[57]

In Oklahoma, the courts determined that the right to casinghead gas was not passed to the grantee because casinghead is neither "oil" nor "gas" as intended by the parties, but is a different substance not contemplated by them. The courts emphasized that contracts in realty should be strictly interpreted in favor of the grantor, with no conveyance or rights passed absent express language.[58]

The Texas courts determined that rights in the casinghead gas passed wholly to the lessee. They held that the lease agreement operated as a conveyance of everything except that which was reserved, and while "oil" royalties were typically reserved, there was no reservation of casinghead gas. The harsh result flowing from this rule was ameliorated by the fiction—elaborately justified—that casinghead gas is oil, and thus subject to the higher oil royalty.[59]

The courts in Louisiana and West Virginia held that since the parties did not contemplate the marketability of casinghead gas, the contract would be adjusted along equitable lines. Such adjustment typically took the form of an assigned royalty interest to the grantor.[60]

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[57] In casinghead gas disputes the gas lessee and the oil lessee were one and the same; the surface owner contended either that he had not meant to convey rights to casinghead gas with the oil and gas lease or that the gas should be considered to be oil so that he would receive a greater payment than he would if it were considered gas.

[58] *See, e.g.*, Hammett Oil Co. v. Gypsy Oil Co., 95 Okla. 235, 218 P. 501 (1921).

[59] *See, e.g.*, Livingston Oil Corp. v. Waggoner, 273 S.W. 903 (Tex. 1925); Hardwicke, *supra* note 56.

[60] *See, e.g.*, Wemple v. Producers Oil Co., 145 La. 1031, 83 So. 232 (1919); Locke v. Russell, 75 W. Va. 602, 84 S.E. 948 (1915). In *Locke* the West Virginia Court observed that:

> No rule of law . . . denies . . . the right to utilize, by any available process, any useless waste from productions contemplated, so long as the lands are operated under the lease to the mutual advantage and profit of the parties, provided, however, the operator pays or tenders to the landowner his proper share or proportion of the returns from such utilization.

There are significant flaws in the casinghead gas-coalbed gas analogy. Production of casinghead gas occurs *only* in connection with extraction of oil by the holder of oil *and* gas rights. Casinghead gas cannot be produced independent of oil production; coalbed gas can, however, be extracted in the absence of coal mining. Moreover, the dispute over casinghead gas is generally a dispute over the amount of remuneration the oil and gas grantor is to receive, while the coalbed gas controversy involves the issue of ownership rather than compensation. Finally, the conflicting holdings of the several state courts on the casinghead gas issue blur any possible legal analogy that might be made, and thus offer little assistance in resolving the coalbed gas ownership problem.

Another possible analogy involves ownership of helium. Helium was first discovered underground in the 1890's. It remained a laboratory curiosity until 1918 when the United States began commercial extraction of helium for use in military balloons during World War I. During World War II the government constructed four plants to meet the greatly increased military need for helium. After the war all of the plants except one were shut down. In the 1950's the demand for helium rose spectacularly. This came from a combination of new uses connected with both science and industry.[61]

From 1937 until 1960, all helium in the United States was processed in government owned plants and was produced from government controlled helium deposits. The enactment of the Helium Act of 1960[62] allowed private industry to participate in the production and processing of helium gas for the first time since 1937.[63] Helium thus became an important commercial commodity and it became necessary to consider whether oil and gas leases permitted the lessees to produce helium.

The cases hold that a grant or reservation of oil and gas include all types of gas including helium.[64] However, these cases are

75 W. Va. at 607, 84 S.E. at 950. Although neither court resorted to the casinghead gas-equals-oil fiction for determining the substantive royalty rights, both used the ⅛ oil royalty as a guide for determining such rights.

[61] Northern Natural Gas Co. v. Grounds, 441 F.2d 704, 708 (10th Cir. 1971).

[62] 50 U.S.C. §§ 167-167n (Cum. Supp. 1978).

[63] *See* Holland, *Is Helium Covered by Oil and Gas Leases?*, 41 TEX. L. REV. 408 (1963).

[64] In *Northern Natural Gas Co. v. Grounds, supra* note 61, the court held that helium was a gas within the accepted, albeit loose, definition of the word; the court concluded that absent specific reservations, the grant of gas by lease covered all

not really apposite, since they do not weigh the conflicting interests of the surface owner and the owners of two distinctly different minerals as in the coalbed gas situation. Rather, the cases turn on an interpretation of the terms "oil and gas."

A further analogy involves ownership of oil shale. Commercial extraction of oil from oil shale has only recently become commercially attractive, and as yet there is little case law on the issue of ownership of this mineral. The leading case in the area is *Brennan v. Udall.*[65] In *Brennan,* land was patented to petitioner's predecessor in interest, reserving to the United States "all the nitrate, oil and gas in the lands." Petitioner contended that these words of reservation did not embrace oil shale; the shale is a solid mineral containing no oil, although petroleum may be produced by a process of destructive distillation. The court's determination that oil shale was in fact included in the reservation turned primarily on interpretation of a federal statute,[66] which authorized the classification of lands containing oil shale deposits as a valuable source of petroleum and nitrogen and required the reservation of such deposits when patents were issued. However, in *Bell Petroleum Co. v. Cross V. Cattle Co.,*[67] a contrary result was reached by the Colorado court in a dispute between private parties.

These two oil shale opinions are not good authority for resolving the coalbed gas question, for *Brennan* turns on the interpretation of a statute and *Bell Petroleum* is based on a nebulous canon of construction which offers no definitive rationale for the holding of the case. Moreover, as in the other analogies considered previously, there is no analogue to the coalbed gas situation where the gas is claimed by the owner of two different minerals as well as the surface owner if he is distinct from the others.

The final analogy to be reviewed involves ownership of geothermal steam.[68] Geothermal steam has an as yet unknown poten-

components of the gas, including helium. Petitioners in *Navajo Tribe of Indians* v. *United States,* 364 F.2d 320 (Ct. Cl. 1966) contended that a lease "of all the oil and gas deposits" referred to gaseous hydrocarbons and not to helium. The court held that although the parties may have been thinking of fuel-type gases, it was more realistic to hold that the helium component of the gas deposit passed to the lessee. *See* Comment, *New Values Under Old Oil and Gas Leases: Helium, Who Owns It?,* 62 MICH. L. REV. 1158, 1173 (1964).

[65] 379 F.2d 803 (10th Cir. 1967), *cert. den.,* 389 U.S. 975 (1968).

[66] 30 U.S.C. § 121 (1970), 38 Stat. 509. (The Act of July 17, 1914).

[67] 492 P.2d 80 (Colo. 1971).

[68] While other analogies could be drawn, it is not the purpose of this article to review all such possibilities. Suffice it to say that in the view of the author, the

tial for energy generation. As in the oil shale area, there is little case law on the issue of ownership of this energy resource.

In *United States v. Union Oil Co. of Cal.*,[69] the United States brought an action to quiet title under the Geothermal Steam Act of 1970[70] so that a determination could be made as to whether the mineral reservation in patents issued under the Stock-Raising Homestead Act of 1916 reserved geothermal resources underlying the patented lands to the United States. The Act reserves to the United States "all the coal and other minerals" underlying the lands. The Ninth Circuit held that geothermal steam was included in the mineral reservation, basing its conclusion on the avowed dual purpose of the Act: to transfer to private ownership public land capable of being utilized for agriculture and forage, while at the same time retaining subsurface fuel resources appropriate for purposes other than stock raising or forage farming.

In *Reich v. Commissioner*,[71] a taxpayer had developed geothermal steam wells and had attempted to take a percentage depletion allowance for them. The Tax Court, after hearing extensive evidence concerning the nature of the steam reserves, held that geothermal steam is a gas within the meaning of the Internal Revenue Code of 1954,[72] which makes oil and gas wells subject to the depletion allowance. The Ninth Circuit Court of Appeals sustained this conclusion as being supported by ample evidence.

These cases do not shed much light on the coalbed gas situation, inasmuch as both holdings are based on the courts' interpretations of controlling statutes. A tangential issue in *Union Oil* may, however, be illuminating. Appellees argued that since they were given the right to drill wells and to develop springs, Congress intended title to underground water to pass under the Act. The court disagreed, noting that commercial development of such resources was not contemplated in the United States at the time the Act was passed. Both the coal owner and the surface owner could look to *Union Oil* for authority. Coal owners could argue that certain incidents of their coalbed gas ownership have traditionally been recognized—specifically, the responsibility to ventilate the gas in the

analogies reviewed are believed to be the most relevant to the coalbed gas ownership problem.

[69] 549 F.2d 1271 (9th Cir. 1977).

[70] 30 U.S.C. § 1020(b) (1970).

[71] 454 F.2d 1157 (9th Cir. 1972).

[72] 26 U.S.C. § 611(a) (1954).

interest of mine safety. Therefore, the argument goes, the right to develop and profit from the methane should accordingly be theirs. On the other hand, the surface owner could argue that since commercial development of methane gas was not contemplated at the time most coal conveyances took place, it cannot be said that such development was in any way within the contemplation of the parties. Following the logic of the court in *Union Oil,* one might argue that the surface owner retained the right to coalbed gas even though he or his predecessor in interest conveyed away coal and gas rights.

ANALYZING THE INTENT OF THE PARTIES TO A MINERAL CONVEYANCE

The crucial issue of intent is a common thread running through the lines of case authority analagous to the coalbed question. The interpretation of the words of an instrument conveying coal or gas rights could have an important bearing on a determination of the intent of the parties thereto.

Courts have generally held that "coal" is a solidified carbon which is clearly distinguishable from oil and gas, notwithstanding the fact that there is a chemical relationship among them. A much more difficult problem arises where, for example, it is argued that an instrument conveying "oil, gas, and other minerals" includes coal, or that an instrument conveying "coal and other minerals" includes gas. The courts have grappled with the terms "minerals" and "other minerals." In most producing states the courts have ruled that the term "minerals" includes oil and gas, unless the instrument creating the mineral interest (by grant or reservation) reveals that the parties intended the term to have a more restricted meaning.[74]

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[73] Bruen v. Thaxton, 126 W. Va. 330, 28 S.E.2d 59 (1943); Horse Creek Land & Mining Company v. Midkiff, 81 W. Va. 616, 95 S.E. 26 (1919).

[74] *See* H. WILLIAMS AND C. MEYERS, OIL & GAS LAW 342 (Index Vol. 1976). *See* Schrier v. Chicago & Northwestern Ry. Co., 96 Ill. App. 2d 425, 239 N.E.2d 281 (1968). For exceptions to the general rule *see* Dunham v. Kirkpatrick, 101 Pa. 36 (1882), which established the Pennsylvania rule that the term "minerals" in a habendum clause is not popularly understood to include "oil and gas" and thus should not be so construed. Therefore, in Pennsylvania at least, a grant of coal rights might not include a right to coalbed gas. Another exception to the general rule may occur in jurisdictions where the rule of ejusdem generis is followed. That doctrine is applied where a granting instrument refers to "hard" minerals (for example "all minerals including coal"). Specific enumeration of various hard minerals manifests an intent to exclude oil and gas under this maxim. *See* Annot., 37 A.L.R.2d 1440, 1442 (1954); *but see* Federal Gas, Oil & Coal Co. v. Moore, 290 Ky. 284, 161 S.W.2d 46 (1942).

An analysis of the coalbed gas ownership problem based solely on cases which interpret conveyancing terms suggests several possible conclusions. It could be asserted that the owner of "coal" has no claim to coalbed gas because the term "coal" is less inclusive than the term "minerals." Also, an argument could be made that the lessee of "natural gas" or "gas" has acquired the right to coalbed gas, the latter being chemically similar to the former.[75]

[75] In deciding what the term "gas" includes, courts have recognized that methane is a major constituent of natural gas. *See* Deep South Oil Co. of Texas v. Federal Power Comm., 247 F.2d 882 (5th Cir. 1957); Northern Natural Gas Co. v. Grounds, 441 F.2d 704 (10th Cir. 1971); Pruitt, *Mineral Terms—Some Problems in Their Use and Definition*, 11 ROCKY MT. MIN. L. INST. 16 (1966). Methane is also the major constituent of coalbed gas, *see, e.g.*, A. KIM, THE COMPOSITION OF COALBED GAS, (Bureau of Mines Report of Investigation No. 7762, 1973). The fact that coalbed gas and gas found in other geological formations are chemically similar was thought to be significant by both the Attorney General of Pennsylvania, *supra* note 44, and the court in *United States Steel Corp. v. Hoge*, *supra* note 6. It was substantially on the fact that natural and coalbed gas are very similar in composition that the Pennsylvania Attorney General concluded, *supra* notes 44, 45, and accompanying text, that coalbed gas was included in a conveyance of "gas" or "natural gas" and reserved if "coal" or "minerals" were severed from a fee estate. In contrast, Judge Toothman's preliminary discussion of the matter in *Hoge* cautiously postponed judgment on the origin of coalbed gas and the implications to be derived therefrom until a hearing on the merits, where expert testimony could be adduced.

The origin of coalbed gas, however, seems to be well established at this time and should not be a major source of factual controversy in litigation. It is by now well established that coalbed gas was formed over the millions of years of the coalification process as a result of a series of biochemical and geochemical reactions that transform plant material into a combustible carbonaceous solid. The rank designations, lignite, bituminous and anthracite are roughly equivalent to different stages in the sequential transformation of plant material to anthracite coal. *See* A. KIM, THE COMPOSITION OF COALBED GAS (Bureau of Mines Report of Investigation No. 7762, 1973); Airey, *Gas Emission From Broken Coal, An Experimental and Theoretical Investigation*, 5 INT'L J. ROCK MECHANICS AND MIN. SCI. 475-494 (1969); Cooper and Murchison, *"Organic Geochemistry of Coal," Organic Chemistry of Coal and its Relation to Coal Carbonization*, 30 J. INST. FUEL 193-214 (1957); FRANCIS, COAL: ITS FORMATIZATION AND COMPOSITION (2d ed. 1961). Coalbed gas is contained in the cracks and fractures prevalent in coal seams and adheres by adsorption on the surface of micropores in the coal. A. KIM, METHANE IN THE PITTSBURGH COALBED, WASHINGTON COUNTY, PA. (Bureau of Mines Report of Investigation No. 7969, 1974); BUREAU OF MINES, *Methane Control in Eastern U.S. Coal Mines*, (Bureau of Mines Informational Circular No. 8621, 1973).

In coal analysis there are four recognized constituents: fixed carbon, volatile matter, moisture and ash; coalbed gas is one of the substances designated "volatile matter". BUREAU OF MINES, A DICTIONARY OF MINING, MINERAL AND RELATED TERMS (1969). The gas in coal is given off while the coal is located *in situs*, during mining, and for a substantial period after coal has been taken from the mine. The gas escapes from coal mostly by percolating through the minute spaces or pores be-

Moreover, under the majority rule, a grant of "other minerals" would include coalbed gas, absent a specific prior conveyance of "gas" or "natural gas."

It must be emphasized, however, that the terms of a deed or lease cannot be interpreted in a vacuum. There are general rules of mineral lease construction that play an important role in judicial decision making. For example, it is axiomatic that the strict definition of a term may be altered when read in the context of the entire document. Also, where there is some ambiguity in the language of an instrument, a court will construe a mineral lease against the party that drafted the lease.[76] Moreover, it is often said that the rights of parties to a mineral lease must be adjudicated in light of the spirit and purpose of the instrument, and not by the application of purely technical rules.[77]

Notwithstanding arguments based on analogies, common law canons of construction of instruments of mineral conveyance, or scientific research on the origin of coalbed gas, the controlling factor should always be the intent of the parties. It is elementary but compelling logic that such intent is best ascertained by giving weight to usage and custom in the industry.

It is helpful at this juncture to note what is *not* involved in the coalbed gas question. The coalbed gas ownership issue does not involve a situation where the existence of the gas was unknown at the time of conveyancing. Rather, its existence and its dangerous impact on mining operations have been known for almost as long as coal has been mined.[78] Nor is this a situation in which the parties were unaware of the value of a mineral. On the contrary, the value[79] was fully calculable on a negative scale.

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tween the coal grains and also in part through fissures most of which are minute. When coal is mined and broken up in the process, gas escapes rapidly from the pores and crevices, but under ordinary conditions mined coal is in compact lumps so that much time is required for complete liberation. DALTON, (Bureau of Mines Bulletin No. 72, 1915). Coal that has lost considerable gas during mining continues to liberate it in the laboratory; one test indicating that gas continued to escape from the coal for six months. C. MCCULLOCH, MEASURING THE METHANE CONTENT OF BITUMINOUS COALBEDS, (Bureau of Mines Report of Investigation No. 8043, 1975).

[76] Williams at 233, n. 41, *supra* note 4. *See* Bettman v. Harness, 42 W. Va. 433, 26 S.E. 271 (1896); Steelsmith v. Gartlan, 45 W. Va. 27, 29 S.E. 978 (1898). It may not always be easy to determine who drafted the lease or deed, especially if the instrument was executed long ago.

[77] *See, e.g.*, Hutchinson v. McCue, 101 F.2d 111 (4th Cir. 1939).

[78] *See generally* C. MARTIN, THE STORY OF A PIECE OF COAL (1908).

[79] Perhaps "value" is the wrong word in this context. Lack of value might be

Could the parties to a gas lease have intended to convey coalbed gas which until recently had a diminimis value? Would the grantor of gas rights have intended to convey coalbed gas for a relatively nominal amount, knowing that extraction of the gas from a coal seam could interfere with coal mining and thus make the extraction of vastly more valuable coal more difficult and less profitable? As Professor Williams observed nearly four decades ago:

> [I]t is conceivable that drilling might seriously interfere with normal removal of the seam. Certainly the present code sections requiring blocks to be left in place, where the casing is drilled through subjacent sands, already burden the industry. If even greater deference must now be shown the landowner, by permitting him to have preferred use of the coal for gas purposes, the operator may begin to wonder what sort of a fee he actually did buy.[80]

Another inquiry relevant to the parties of a gas lease would be whether the grantee intended to obtain title to coalbed gas in light of its explosive propensity. If title were in the grantee, would not responsibility for damages caused by a coalbed gas explosion be placed on him, since it has been known at least as early as 1920 that degasification in advance of mining is technically feasible?[81]

It is difficult to overlook the obvious: coal operators have borne the responsibility for the disadvantageous aspects of coalbed gas ownership from the first day coal was extracted from a deep mine. Over the years there have been no recorded objections by gas or surface owners to the imposition of such responsibility on the coal owner and, indeed, one would be compelled to conclude that the raising of such objections would cast serious doubts on the sanity of the objector.

The strongest argument in favor of the gas owner's right to coalbed gas is simply that he purchased the right to extract natural

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more accurate; in any case, the point is that the parties had full knowledge of the relative worth of the gas found in coal deposits.

[80] Williams at 222, *supra* note 4. Any profit that might be derived by the gas lessor from coalbed gas (until very recently) would be of little consequence. The sale of coal has been demonstrably profitable for over a century.

[81] The technology to remove coalbed gas in advance of mining has been known for many years and has been utilized in Europe for over fifty years. In England, gas recovered from coal mines has been utilized as a fuel for twenty years and accounts for a substantial income for the National Coal Board; the Coal Board sells coalbed gas to Area Gas Boards. *See* Swift, *Methane Drainage in Great Britain*, COAL AGE (Feb., 1970).

gas wherever it is located beneath a tract, and that coalbed gas is a natural gas. But "natural gas" or not, is this what the gas owner really intended to purchase, together with attendant responsibilities for degasification or for damages arising from an explosion? An affirmative answer to this question strains the limits of credibility. Any person acquainted with the customs of the coal industry knows that coal operators have accepted responsibility for coalbed gas explosions because they are aware that such responsibility is part of the bargain. In the same fashion, anyone cognizant of the customs of the natural gas industry is fully aware that the gas lessee has wanted no part of the almost valueless coalbed gas, and certainly would never have withdrawn from a proposed conveyance because the right to extract coalbed gas was being withheld.

Thus, while reasonable arguments can be made in favor of the gas owner's right to coalbed gas,[82] if the intent of the parties is to be the ultimate criteria for determining ownership, on balance, the scale tips heavily in favor of the coal owner. This is so regardless of whether coalbed gas originated in and is part and parcel of the coal or not. Moreover, it should be emphasized that even if the parties to a conveyance intended for the coal owner to control and to dispose of the coalbed gas as he chose, the commercial use of such gas was not within the contemplation of the parties.[83]

How this impediment to exploitation of coalbed gas reserves can be removed is a matter of conjecture. The possibility that presents the best hope of resolution would be amicable negotiation between the parties, ending in an agreed royalty or rental. If this proves to be unsatisfactory and the courts view the surface owner's reluctance to negotiate as an unreasonable obstacle to the vindica-

[82] *See, e.g.*, Op. Pa. Atty. Gen., *supra* note 44; *see also* note 91, *infra*. It is Williams' thesis that "a prior outstanding lease of the undiscovered fugacious minerals extends to any and all strata that may yield production" [including coal seams]. Williams at 216, n. 20, *supra* note 4. Thus Williams suggests that "where there has been conveyance of coal subject to an outstanding oil and gas lease, it would appear that the latter has prior claim to the gas, wherever found." *Id.* at 215-16. Williams concedes, however, the point made here: "That would not be the ordinary construction placed on [the lease] by the original parties." *Id.* Williams does not, however, express a preferred position as to the ultimate outcome when coal is severed prior to oil and gas.

[83] The argument would be similar to the one successfully made in almost all jurisdictions by surface owners who did not explicitly grant the rights to extract coal by strip mining methods. The owner of gas rights, if distinguishable from the owner of the surface estate, would have no interest in this controversy because the burden runs to the land only.

tion of the coal owner's rights, a settlement could be imposed upon the parties, thereby granting to the surface owner a reasonable royalty to compensate him for interference with enjoyment of his land.[84]

STATE AND FEDERAL REGULATION OF COALBED DEGASIFICATION

After reviewing the history, technology, economics and legal issues relating to coalbed gas extraction, at least one thing is crystal clear: large quantities of the gas are being ventilated to the atmosphere and wasted at a time when the nation's energy resources are being depleted. As the Department of Energy's Task Force on Methane Drainage accurately observed, "where ownership [of mineral rights] is fragmented, determination as to who has the right to remove and market methane from coalbeds could become a significant deterrent to development."[85] There are other

[84] If a gas lessee is held to have the right to extract coalbed gas for profit, he would also be required to make payments to the lessor according to the terms of the lease. The Virginia legislature recently enacted a measure which attempts to deal with the ownership problem:

> A. Except as otherwise provided by law, on or after January one, nineteen hundred seventy-eight, all migratory gases, including but not limited to propane and methane, shall be conclusively preserved to be the property of the owner of the surface real property beneath which such migratory gases are or may be located.
>
> B. Litigation involving the legal construction of lease agreements entered into prior to the effective date of this section shall be governed by the applicable law in effect at the time the agreement or agreements were entered into. The circuit court in which such proceedings involving the construction of such leases are heard may permit, in the discretion of the court, commercial extraction of migratory gases; provided, however, that the court shall order reasonable royalties from the sale of such gases to be placed in an escrow account until the ownership of such gases is determined by final court order.

VA. CODE § 55-154.1 (Supp. 1978).

Presumably, the import of subsection (A) of the Virginia Act is intended to impose upon the courts the legislative directive that subsequent to January 1, 1978, instruments which sever mineral rights from a fee estate from which such rights had not theretofore been conveyed, can be interpreted to lease or grant coalbed gas only when such intent is explicitly stated in the instrument. Subsection (B) sets forth a format by which extraction of coalbed gas can take place even if its ownership is being litigated. It is not clear what the import of this provision is, for it refers only to "lease agreements" and does not seem to contemplate ownership disputes involving the grant of coal rights by deed.

In Pennsylvania three bills were proposed in the General Assembly in 1977 but not passed. *See* Pa. H.B. 181 (1977); Pa. H.B. 719 (1977); Pa. H.B. 720 (1977). The West Virginia legislature has also considered and rejected methane gas legislation in recent years.

[85] REPORT OF THE AD HOC TASK FORCE, *supra* note 25.

institutional constraints on the development of the coalbed gas resource. For example, states have separate sets of regulations for oil and gas activities and for coal mining operations. The task force emphasizes some of these problems:

> Will the oil and gas regulations apply to methane removal or will a separate set of regulations be required? West Virginia, for example, does not require permits for air shafts or ventilation holes in mining activity, yet these permits are required for holes or shafts made for gas production. Coal mine operators are required to vent gas to the atmosphere to minimize explosions in the mine, while the oil and gas regulations read, "waste of oil or gas is hereby prohibited." Regulations dealing with spacing, completion, and abandonment may not be appropriate for vertical or horizontal holes in coal seams. Well stimulation is a commonplace oil and gas practice, however, this activity may have to be controlled when recovering coalbed methane to protect miners in future mining operations.[86]

There is another factor which is not a constraint on gas development, but which has the potential to impede recovery of much needed coal resources. Simply put, this factor is the ability of an unscrupulous or otherwise self-interested individual to purchase gas rights and to parlay the unanswered ownership question into a profit by holding coal reserves for ransom, so to speak. This could be done, absent spacing regulations, by a gas owner's drilling of wells to the coal seam in such a way as to impede advancement of mining operations. Moreover, if the gas owner is declared by the courts to be the owner of coalbed gas, absent applicable regulations such owner could undertake to hydrofracture the coal, and thus create fear in the coal owner that later mining might be adversely affected. Although the value of coalbed gas is a small fraction of the value of the coal itself, the gas owner would be in a position to tacitly coerce the coal owner into buying him out to preserve the mineability of the coal.

This situation cries out for legislative attention. It is well established that Congress and the state legislatures have the power to enact appropriate legislation ensuring that the coalbed gas resource will not be wasted and ensuring its orderly development.[87]

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[86] *Id.*

[87] An existing example of legislation which could forestall waste of coalbed gas is the National Environmental Policy Act (NEPA). 42 U.S.C. §§ 4321-4361 (1970). It would seem to require an environmental assessment or impact statement prior to leasing on western federal coal lands to determine the effect on the coalbed gas resource contained therein. NEPA requires that a detailed environmental impact

In *Ohio Oil Co. v. Indiana,* a case decided at the turn of this century, the Supreme Court of the United States upheld an Indiana statute which prohibited a common owner from allowing the escape and waste of gas or oil from a well,[88] to the detriment of other common owners. The reasoning of *Ohio Oil Co.* clearly would allow legislative regulation of coalbed gas extraction to protect the public interest in conserving the nation's energy resources and to reasonably mediate between conflicting rights of surface, coal and gas owners. *Ohio Oil Co.,* however, would not support a law which would by legislative fiat proclaim coalbed gas to be owned by one or the other of the competing parties in interest.[89] The court said that "as to gas and oil, the surface proprietors [gas owners] within the gas field all have the right to reduce to possession the gas and oil beneath. They could not be absolutely deprived of this right . . . without a taking of private property."[90]

Thus it is that the states and the federal government may by thoughtful and reasonable regulation of the means of coalbed gas extraction, bring order to what might otherwise develop into a chaotic situation. Moreover, the government might use other means such as government funded demonstration projects and tax and rate incentives to encourage commercial extraction of coalbed gas.[91]

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statement be performed on "any irreversible and irretrievable commitments of resources. . . ." *Id.* § 4332(2)(c)(v).

[88] 177 U.S. 190 (1900). *See also* Del Monte Mining Co. v. Last Chance Mining Co., 171 U.S. 55 (1898). In upholding the state's right to regulate extraction of oil, the Court in *Ohio Oil* observed:

> [I]t is certain, if there can be no authority exerted by law to prevent the waste of the entire supply of gas and oil, or either, that the power which exists in every one who has the right to bore from the surface and tap the reservoir involves in its ultimate conception the unrestrained license to waste the entire contents of the reservoir by allowing the gas to be drawn off and dispersed in the atmospheric air. . . .

171 U.S. at 201.

[89] One bill proposed in Pennsylvania would have vested title of coalbed gas in the state without regard to the rights of surface, gas or coal owners. Pa. H.B. No. 181 (1977). Proposed West Virginia legislation would have vested title to coalbed gas in the owner of natural gas rights to the exclusion of all other claimants.

[90] 177 U.S. 190, 209.

[91] The Federal Energy Regulatory Commission (FERC) has recently proposed a regulation to exempt coalbed gas sales from lower interstate rates:

> § 157.41 Exemption of Sales by Coal Mining Operations:
>
> Public interest does not require the issuance of a certificate authorizing the sale of natural gas produced as a byproduct of coal mining operations provided that any jurisdictional pipeline company, or other person undertaking such a purchase, shall so advise the Commission immedi-

CONCLUSION

While government can and should play an important role in promoting the conservation and commercial use of coalbed gas as a fuel, the biggest obstacle to recovery of the natural resource is the ownership issue. Investors will surely be reluctant to place their dollars in projects which invite litigation and thus make profitable return uncertain. The ownership problem is, in the view of this writer, not one which is amenable to legislative resolution.[92] Rather the courts of each jurisdiction will, in the last anaylsis, determine the rights of coalbed gas ownership through a case by case analysis of the instrument of conveyance and the intentions of the parties thereto.

The issue facing the courts is similar to that faced by a Pennsylvania court at the end of the nineteenth century:

> This is a new question and one that is full of difficulty. The discovery of new sources of wealth, and the springing up of new industries which were never dreamed of a quarter of a century ago, sometimes present questions to which it is difficult to apply the law as it heretofore existed. It is the crowning merit of the common law, however, that it is not composed of ironclad rules, but may be modified to a reasonable extent to meet new questions as they arise.[93]

Courts applying common law principles are indeed capable of adjudicating the question of coalbed gas ownership. Few tenets of the common law are better established than the proposition that when viewed in light of all of the circumstances, the intent of the parties to a contract, lease or deed should prevail. Courts applying this traditional rule should have little problem concluding that the grantee or lessee of coal purchased the right to, as well as the responsibility for, coalbed gas.

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ately by telegram or letter stating briefly the circumstances and shall within ten (10) days file a statement in writing and under oath, together with four (4) conformed copies thereof, setting forth the purpose and character of the purchase, the rate being paid, the estimated volumes to be delivered, the seller of the gas, the date of initial delivery, the location of the sale, the facts warranting invocation of this section, and, upon completion of the sale, shall advise the Commission of the actual volumes delivered and the price paid pursuant to this section.

See OLSON, INSTITUTIONAL CONSTRAINTS TO THE DEVELOPMENT OF COALBED METHANE, (U.S. Department of Energy Proceedings, Pittsburgh, Pa., January, 1978).

[92] *See* discussion of the unconstitutionality of such legislative action at notes 89 and 90, *supra*.

[93] Chartiers Block Coal Co. v. Mellon at 294, *supra* n. 46.